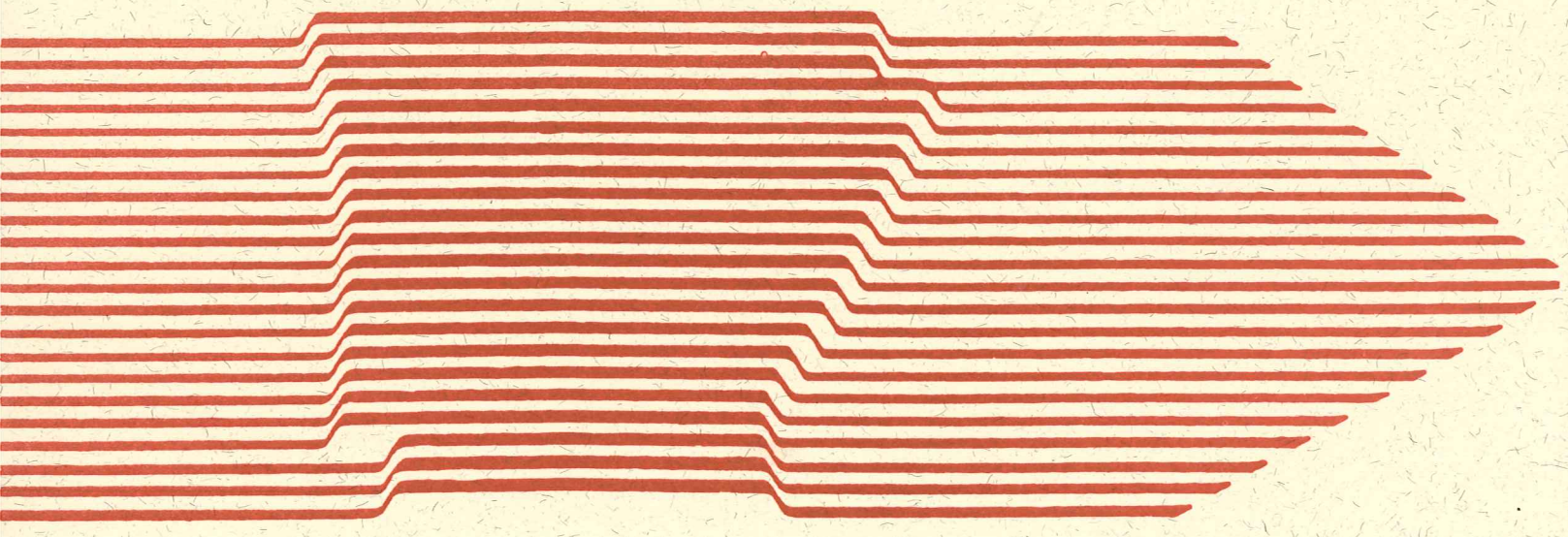
Arkansas Science & Technology Authority



Annual Report FY 1991

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Arkansas Science & Technology Authority

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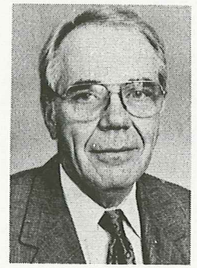
June 30, 1991

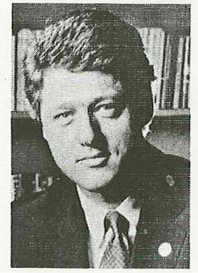
Governor Bill Clinton
Members of the 79th General Assembly
State Capitol
Little Rock, Arkansas 72201

Dear Governor Clinton and Legislators:



The board of directors and staff of the Arkansas Science & Technology Authority are pleased to submit to you our 1991 Annual Report, recounting some of the highlights of the ASTA programs over the past year.

Arkansas' greatest resource is its people, coupled with their drive and commitment to excellence. These are the people, who as scientists or entrepreneurs, are shaping the scientific and technological future of the state. Through ASTA's expanding Basic and Applied Research Grant programs and progress in the areas of technology development and industrial networking, Arkansas is developing a strong foundation for partnering academics with industry.



In eight years ASTA has come a long way towards accomplishing its goal of bringing the benefits of science and technology to the people of Arkansas. In 1991, ASTA awarded more funding than any other year for Basic and Applied Research Grants, the state is considered a model for networking existing industries, our business development programs give new Arkansas-based, technology-related companies the opportunities and money they need to succeed, and each day new opportunities to transfer technology from the laboratory to the marketplace are pursued.

We appreciate your continued support, and look forward to working with you to assure a promising future for Arkansas.

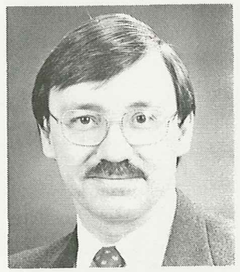
Sincerely,

John W. Troutt, Jr.
Chairman of the Board
Arkansas Science & Technology Authority

ASTA sets sights on year 2000

Over the past decade, science and technology development has emerged as one of the most critical components of the global economy, and Arkansas has the means to capitalize on this new wave of economic development.

In 1991, the Corporation for Enterprise Development "graded" all the states in areas of economic development, from earnings and job quality to international marketing. Arkansas' technology and innovation policies earned an "A" in the Corporation for Enterprise Development's Development Report Card for the States.



John W. Ahlen, Ph.D.
ASTA President

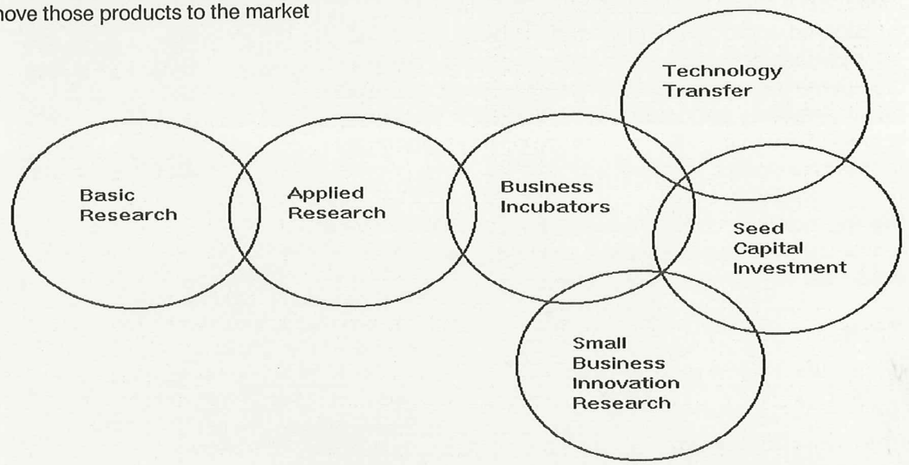
"This tells us that Arkansas has the policies in place to meet the needs of small and medium-sized companies," according to ASTA President John W. Ahlen. "With the domestic and global marketplaces as competitive as they are, it's essential that smaller companies have access to leading edge technologies that can give them a chance for long-term success."

Even more significant, that "A" put Arkansas in 7th place in the country in technology and innovation policies. Technology and innovation is described as "the extent to which the state has invested in technology development and deployment to modernize existing firms and incubate new ones." The report found that state-supported technology programs tend to fall into two categories: programs designed to stimulate applied research for business use, and those designed to help modernize existing businesses and create new companies. The evaluation is based on the existence of research and development centers, research and development grants, technology transfer, technology deployment, and business incubators.

That single excellent mark is a foothold for achieving high grades in other areas of scientific and technology development. ASTA is cultivating strategies for bridging the gaps between existing programs. These programs range from basic scientific research to seed capital investment in new technology-related companies. Every program operates within one of these two dimensions:

Technology development, where ideas are evaluated, discoveries are made, and prototypes and products are developed, and

Business development, where businesses improve operations, processes, and products and move those products to the market



ASTA recognizes that an expanded and successful science and technology base is possible for Arkansas because state leaders have established policy for what needs to be done in the area of technology and innovation. Arkansas has shown that it can perform in these areas and has the footing to be a national leader. ■

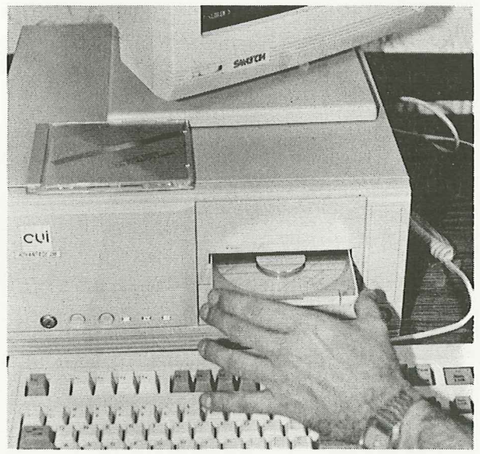
Local and national companies benefit from seed capital program

When TSI, Inc. chief executive officer James Sherblom began looking for a site in which to expand the operations of the Massachusetts-based life sciences company, Arkansas was not at the top of the list. But the availability of a vacant laboratory in Redfield and the proximity of the National Center for Toxicological Research in Jefferson made Arkansas more appealing. Through the efforts of the Jefferson County Industrial Foundation, and joint financing from the Arkansas Science & Technology Authority, the Arkansas Industrial Development Commission, and Simmons Bank, TSI chose to expand its operations to Arkansas.

Seed Capital Investment Fund, FY 1991

Beginning balance, money market accounts		$263,968.63
Interest earned and principal repaid		
Interest, money market accounts	$12,397.45	
Interest, CD account	110,415.47	
Interest, Seed Capital accounts	84,874.60	
Principal, Seed Capital accounts	130,767.98	
Total principal repaid and interest earned		338,455.50
Fund expenses less FY 1991 investments		45.00
Ending balance, money market accounts		350,000.00
Investments receivable		701,048.21
Certificates of deposit		1,500,000.00
Total Seed Capital Investment Funds balance		**2,453.427.34**

TSI-Redfield provides pre-clinical safety and efficacy testing for companies that have products which require Food and Drug Administration or Environmental Protection Agency approval. ASTA invested $250,000 in the company. TSI bought and renovated the eight-year old, 57,000 square-foot building. Over the next five to seven years, the testing facility is expected to bring more than 100 jobs to the Jefferson County area. ■



A Fort Smith attorney had an idea for making the lives of his fellow lawyers a lot easier: he wanted to index legal decisions onto a compact disc, simplifying the time consuming task of researching legal cases. But Kyle Parker had a problem: finding additional dollars to make his idea reality.

That's where the Arkansas Science & Technology Authority stepped in. In January, 1991, the ASTA Board of Directors approved a $200,000 investment through the Authority's Seed Capital Investment Program.

Law Office Information Systems, Inc. (LOIS) produces a CD-rom (compact disc, read-only memory) product called CaseBase, which indexes over 40 years of a state's case law onto a compact disk. The company is developing CD-rom for Connecticut and Rhode Island; it was first constructed from Arkansas case law.

With CaseBase, lawyers do not need to search through volumes of court cases to find previous legal decisions. CaseBase not only saves time, but it provides for a more thorough search. The person using the program can electronically search for key words and phrases that may relate to the current case. And unlike LOIS' competitors, CaseBase does not require an expensive modem hookup to a centrally-located database: it loads onto any personal computer with CD-rom capabilities. ■

Industrial networks foster cooperation and competitive clout

In fiscal year 1991, technology transfer in Arkansas became more than just a catch-all description for everything that happens at the Arkansas Science & Technology Authority. Although technology transfer --the transfer of knowledge and technology from the laboratory to the marketplace-- is a visible element in ASTA's programs, two specific technology transfer projects came about this year: the Arkansas Industrial Network Project and the Technology Extension Pilot Project.

Companies that normally compete with each other can still work together. That's the philosophy behind industrial networking. And that's the concept behind the Arkansas Industrial Network Project. Alone, small and medium-sized businesses are often unable to compete on a national or international level with larger firms. So they join forces. Networks provide a system which allows small and medium-sized Arkansas firms to learn about and benefit from new technologies. This can be accomplished by sharing:

- *research and development costs*
- *purchasing*
- *training programs*
- *administrative costs*
- *costs of expensive technology or engineering*
- *bids on larger contracts*

One Arkansas network, the Metalworking Connection, Inc., has demonstrated how a successful network can benefit its participants. Because they have "networked" and worked together, their insurance premiums are lower, when purchasing supplies as a group they pay less, and as a unit they are able to afford more market research, advertising, and training programs, making the network as a whole and the individual businesses more competitive. Fifty-four companies belong to the Metalworking Connection.

With a grant from the Southern Technology Council and the Winthrop Rockefeller Foundation, ASTA helped create the Arkansas Industrial Networking Project. The Authority held three, two-day seminars on networking, bringing potential "brokers" together to hear about the benefits of industrial networks.

Getting technology from the laboratory to the marketplace

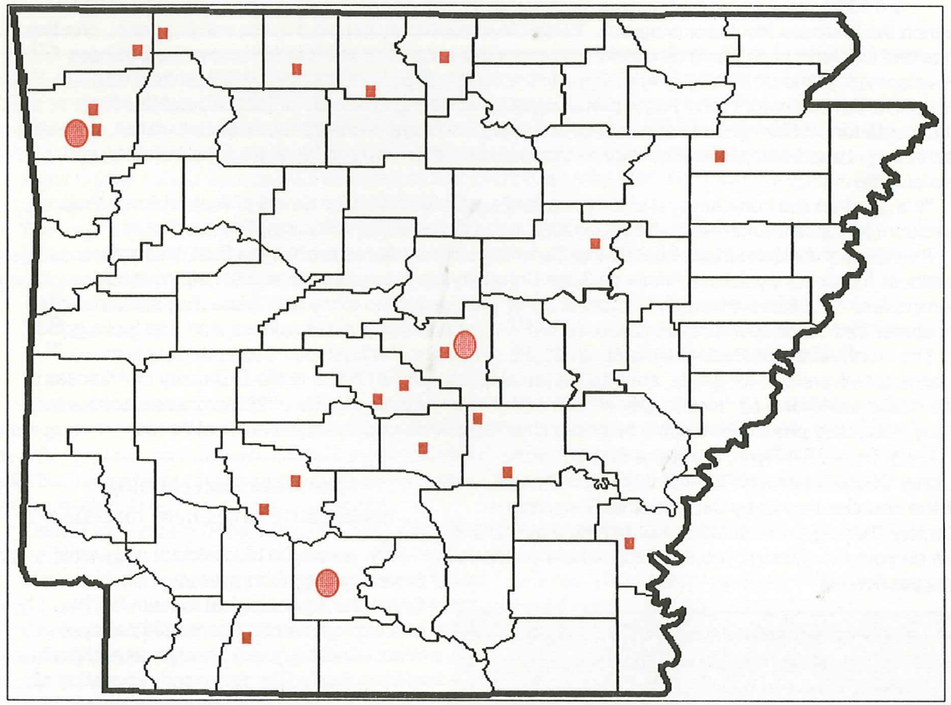
A new technology extension project is helping more than two dozen small and medium-sized Arkansas companies find answers to their technical questions.

Through a $125,000 grant from the U.S. Department of Commerce National Institute of Standards and Technology, ASTA's Technology Extension Pilot Project was born. It is designed to increase the transfer of federal technology to help small businesses solve their technological problems.

Since the project began, 28 companies across Arkansas are getting the help they need. Their problems range from upgrading current technology in military patrol craft engine designs to integrating windmill-generated power into a standard electrical system.

Through ASTA, the grant funds three technology assistance service providers (TASPs) to help the businesses evaluate their technology-related problems and find the solutions.

- Arkansas Center for Technology Transfer,
  University of Arkansas, Fayetteville
- College of Science and Engineering Technology
  University of Arkansas at Little Rock
- Center for Competitive Manufacturing
  Southern Arkansas University-Technical Branch at
  Camden.



Technical Assistance Service Providers (TASPs)

Locations of one or more companies served by the Technology Extension Pilot Project

AIREX Company, Little Rock
Arkansas Patents, Inc., Mountain Home
Carrier Corporation, Arkadelphia
Cloud Corporation, Harrison
The Dove Corporation, Yellville
Dumas Cotton Warehouse, Dumas
EASCO Hand Tools, Inc., Springdale
Fiber Resources, Pine Bluff
Fountain Lake Shopping Center, Hot Springs
Franklin Electric Company, Inc., Siloam Springs
Gates Rubber Company, Siloam Springs
General Electric Motor Company, Jonesboro*
Instructional Fitness Programs, Inc., Fayetteville
JEVAC, Magnolia
Marimba Productions, Inc., Gurdon
Mid-South Reclamation Industries, Smackover
North American Marine Jet, Benton
Pel-Freeze, Rogers
PRM Energy Systems, Hot Springs
Quail Valley Farms, Little Rock
Roberson Metals, Inc., Arkadelphia
Rohr Industries, Sheridan
Sanco Corp., Benton
Simrell Farms, Garfield
TSI Redfield Laboratories, Inc., Redfield
Underground Construction Company, Arkadelphia
Yarbrough Tire Shredding and Rubber Recycling, Bradford

*Company has two technology transfer projects

Incubators benefit hometowns

In 1986, the Arkansas Science & Technology Authority collaborated with three universities to launch the business incubator program. Three other incubators followed in the coming years, creating jobs and bolstering economic development across the state. The Institute for Innovative Business Development at the University of Arkansas at Pine Bluff is expected to open by December, 1991. In five years, the incubators have had a part in creating or saving hundreds of jobs around the state. The incubators, which provide space and/or management and technical assistance to small, start-up technology-based companies, facilitate a unique partnership between the state, local industry, and universities.

"It's good for the community and it's great for Fayetteville," Service Corps of Retired Executives president Margaret Parrish said about Genesis, at the University of Arkansas, Fayetteville.

President of the Jonesboro Chamber of Commerce Henry Jones praises the East Arkansas Business Incubator System at Arkansas State University for doing more than just helping local companies. "It creates an image for our industrial prospects," he explains. "Here they see a business incubator that's a cooperative effort between ASTA, the university, and business, and that looks good."

The North Arkansas Business Incubator System in Salem, the Business Center at Southern Arkansas University in Magnolia, and the Industrial Renaissance Center at the University of Arkansas at Monticello are known as "incubators without walls." Rather than provide office space and access to equipment, they provide invaluable business planning advice and management assistance.

According to Bill Flynn, executive director of the Ashley County Industrial Development Commission, one of the counties served by the Industrial Renaissance Center, "Having an incubator is something that you can put on your list of things you have that shows you're progressive." ■

Firms collaborate with federal agencies

The Small Business Innovation Research program, monitored by the U.S. Small Business Administration, provides opportunities for qualified small businesses to compete for awards that meet the specific research and development needs of the federal government. There are two phases available for businesses: phase one applicants are eligible for up to $50,000. Under phase two, firms can apply for up to $500,000. That research will likely result in new products, processes, or services of interest to the federal government. Eleven federal agencies participate in the program.

ASTA coordinates SBIR efforts for Arkansas. The Authority provides information that helps businesses apply for the federal money. Since the program began four years ago, six Arkansas companies have received 13 awards totalling more than $2.5 million.

Two Arkansas businesses received more than three-quarters of a million dollars in federal fiscal year 1990-91 as part of the SBIR program:

Engineering Resources of Fayetteville (a tenant in the Genesis incubator) acquired a phase two grant of $500,000 to study the biological production of hydrogen, from the U.S. Department of Energy;

The U.S. Department of Transportation awarded $292,739 to **ETC Engineers, Inc.** of Little Rock to study and evaluate fiber reinforced dowell bars for highway use. Both companies have been recipients of earlier SBIR funding. ■

National biotechnology cooperative takes new direction

A dramatic blueprint for a National Biotechnology Cooperative at the National Center for Toxicological Researcher has been completed by Cromwell Truemper Woodsmall Levy and Thompson Architects of Little Rock. The proposed renovation of unused facilities and grounds at the NCTR includes a large animal courtyard, greenhouse, and a conference center, along with nearly 100,000 square feet of laboratory and office space.

The design was completed as part of the National Biotechnology Cooperative Feasibility Study and Master Plan, a two-year contract funded by the U.S. Food and Drug Administration and ASTA. The cooperative is proposed as a demonstration project whereby new and different methods of cooperation among industry, government, and universities could be tested. The mission would be to focus on speeding the commercialization of biotechnology products and processes. In a national survey of biotechnology companies conducted last year by Ernst and Young, over 200 small to medium-sized biotech companies indicated interest in a biotech cooperative.

A business plan and cooperative research and development agreement are due to be completed by December, 1991. ■

Other agencies adopt EPSCoR formula

Because of its success and its popularity among national policy makers, three federal agencies have initiated versions of the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR). The Department of Energy, the Environmental Protection Agency, and the National Aeronautics and Space Administration each launched EPSCoR-like programs to benefit the states receiving the least amount of federal research and development dollars.

In fiscal year 1991 Arkansas was awarded its first grant under the NASA-EPSCoR program, and submitted proposals under EPA- and DOE-EPSCoR programs.

This year's $150,000 NASA grant (matched by $75,000 from the state) will enhance Arkansas' research and education network in aerospace science and technology. Seven universities make up the Arkansas Space Grant Research Consortium:

- Arkansas State University
- Harding University
- University of Arkansas
- University of Arkansas at Little Rock
- University of Arkansas for Medical Sciences
- University of Arkansas at Pine Bluff
- University of Central Arkansas

A proposal under the NSF-EPSCoR program was submitted for a three-year, $4.5 million continuation grant for three Centers of Excellence, established in 1987. Three Centers of Excellence, funded by NSF, and now in their second year, build on Arkansas' research strengths. They also serve as an effective recruitment tool, attracting top-ranked researchers from around the country and thereby strengthening Arkansas' research capacity.

Center for Protein Dynamics, UA: This Center focuses on development of the first commercial bioherbicide and the study of sequence-modified proteins and fast reactions.

Arkansas Neurobiology Research Center, UAMS: This two-year center has 20 investigators working in six areas of neurobiology, including motor control development and schizophrenia.

Center for Cellular and Molecular Studies on Biological Aging, Veterans Administration Hospital/UAMS: Researchers at this Center are exploring the basis of biological aging in a variety of model systems including blood cells, muscle cells, and connective tissue cells. ■

Alternative energy research gathers steam

War in the Persian Gulf this year made the United States acutely aware of its growing dependence on foreign fuel. The eight-year old Southeastern Regional Biomass Energy Program (SERBEP), managed under contract from the U.S. Department of Energy by the Tennessee Valley Authority, seeks ways to encourage regional production of biomass as an alternative energy source.

Biomass is defined as land and water vegetation and wastes containing significant amounts of vegetative matter. SERBEP advocates producing, harvesting, and handling biomass resources, and then converting that biomass into energy.

As the Arkansas coordinator to SERBEP, ASTA Vice President Research Dr. Joe Gentry is responsible for soliciting biomass proposals. In 1991 SERBEP awarded $35,000 to the Cloud Corporation in Harrison. The grant helped Cloud --a company that makes laminated flooring for semi-truck trailers-- buy a renovated steam engine-driven generator. Cloud uses wood waste produced at the mill to heat a boiler. The steam powers the generator which runs the factory. Exhaust steam is used to heat the kilns. This system saves Cloud thousands of dollars a year in energy costs.

The U.S. Department of Energy Biomass Energy Program serves four other regions across the country: the Northwest, the Great Lakes, the Northeast, and the West. ■

UA physicists take lead in squeezed light research

If it weren't for basic research grants from the Arkansas Science & Technology Authority, some of the University of Arkansas, Fayetteville's brightest and newest physics stars would be forced to leave the state. That's the opinion of Physics Department Chairman Dr. Rajendra Gupta. He says new professors are faced with a Catch-22: the University can't afford to fund their research, yet they need research to be successful. Federal funds are available, but only for researchers who already have their labs set up.

The Basic Research Grant program competitively awards grants to support scientific and engineering esearch at Arkansas colleges and universities, particularly research that could have an economic impact.

To universities around the country that want to have an impact on their regional economic development, research is the magic word. Traditionally, the federal government is the most significant source of research dollars. ASTA's Basic Research Grant Program helps Arkansas scientists become more competitive for these federal funds.

ASTA will fund up to 60% of of a project's total cost; the sponsoring school matches with 40%.

"The funding for the university is so little," Gupta explains, "that they (the professors) don't have money for starting research. Now ASTA has come in and has been extremely helpful in that respect."

The ASTA investments are paying off.

In 1991, Dr. Min Xiao was awarded a $75,516 basic research grant from ASTA. His goal is to learn more about squeezed light. Squeezing the light reduces what is known as quantum noise. This becomes important in various applications, such as optical communication, optical computing, and precision measurements.

Dr. Reeta Vyas is using a $39,794 grant she received from ASTA to also study squeezed light Her equipment, though, is not a laser in a laboratory, but a computer. As a theoretician, Vyas is studying the behavior of squeezed light based on the statistical properties of photons. She says that understanding the statistical properties of photons is one step in the process of understanding the quantum nature of light and its sources. She contends that the theoretical techniques and insights gained from these studies will be useful in understanding the dynamics and the noise characteristics of a variety of systems, like optical communications.

Theoretician Dr. Julio Gea-Banacloche received a $33,972 ASTA grant to study how light nteracts with simple atomic systems. The outcome of his research will be a step towards a better understanding of how these systems behave, and how they can be useful. He speculates the most likely use of his research will be improving the accuracy of the atomic clock, which is an extremely precise electronic device that is used in satellite tracking systems.

The University of Arkansas is one of only a few schools in the country advancing scientists' understanding of squeezed light. And with that understanding comes the opportunity to improve optical communications capabilities and precision optical measurements. ■

Building a better engine

"When Pratt and Whitney and General Motors want to design more efficient engines, they just design empirically different parameters until they think they have the best conditions," UA Physics Department chairman Dr. Rajendra Gupta explains. "But the physics and chemistry of the process are not understood at all." Gupta is using a $15,392 ASTA Basic Research Grant to study one aspect of the little-understood process of combustion.

Atomic hydrogen plays one of the most important roles in chemical combustion, and it's that role Gupta is studying. But it can be tricky, he warns. By using optical techniques, Gupta hopes to develop a means of "seeing" the hydrogen atom. But to "see" hydrogen, Gupta's first step is to seed the flame with sodium, which emits a yellow light and also absorbs yellow light. The visible sodium atoms then communicate with the hydrogen atoms during their frequent collisions. Laser light can then provide information about the hydrogen atoms.

Ultimately, Gupta's research could be one phase in the campaign to take the guesswork out of combustion, and eventually improve engine design. ■

"A" = Acxiom, algorithms, and applied research

For Acxiom Corporation of Conway, eliminating duplications in mailing lists could mean saving thousands of dollars in computer and mailing costs. To do that, Acxiom, one of the world's largest integrated direct marketing companies, pursued a way to refine some of its existing computer systems operations. The company wanted programs which would more efficiently identify similar strings of characters in several of their database operations.

University of Arkansas computer scientists Hal Berghel and David Roach, and UALR computer scientist John Talburt, were commissioned to take their research a step further. Acxiom and the Arkansas Science & Technology Authority each awarded Berghel and his team $40,000 under the Applied Research Grant Program to advance the efficiency of an existing technique known as approximate string matching, or ASM, algorithms.

A little bit of math goes a long way

ASM, Berghel explains, is a means by which computer systems compare data in terms of the degree to which they are similar to one another. Since Acxiom works with such large mailing list databases, even minor improvements in the performance of the system can make a big dollar difference.

Acxiom's group executive of research and development George Balogh suggested to Berghel that he and his research team develop new algorithms altogether, rather than continually refine existing ones. Balogh and his co-worker, Carroll Hyatt, worked with Berghel and his team in the search for such algorithms.

Research benefits both the company and the researchers

Berghel says the benefits of such research are two-fold. For industry, it can create the opportunity to increase computer productivity and technological awareness. On the academic front, the benefits are peer-reviewed research publications which find their way into the technical literature and bring credit to the researchers and their institutions.

Balogh says the grant allowed Berghel, Talburt, and Roach to "focus more talent in a shorter timeframe." Consequently, Balogh says the theoretical and practical breakthroughs came more quickly. And that's good for all involved. "Acxiom anticipates putting the results to practical use before year's end," Balogh maintains. "For us the effort to blend academic research goals and practical application has been a success."

Research could help scientists with human genetic map

From a scientific point of view, Berghel says other possible applications of this research are far reaching. "The primary beneficiary may be the human genome project, which is attempting to create a genetic map for humans." Berghel notes that the complicated comparisons between chromosomes are necessary in order to understand inherited characteristics. The chromosomes are strings of symbols which come from an alphabet of four letters. By noting differences and similarities between these strings, inherited characteristics can be traced. With strings that are several billion characters long, computers, and efficient ASM algorithms, are critical.

Berghel says work like this really requires cooperation between industry and academia if it is to benefit both. "When that happens, everyone goes away happy," he stresses. "That's...a win-win situation: good science and technology transfer as equal by-products of the partnership." ■

The Applied Research Grant program is a three-way effort between ASTA, the researcher, and industry.

Grants are awarded on a competitive basis, and go to projects that support scientific and engineering research at Arkansas colleges and universities. Industry involvement furthers the goal of contributing to the state's economic development.

Participating Arkansas companies match each ASTA dollar one-to-one for research that will help the company improve or develop new products. ASTA matches two-to-one for companies with 50 or fewer employees Not only do these companies get improved technology at a bargain, the state allows a tax credit to those firms that participate.

Total ASTA Research Grants Awarded
Fiscal Year 1991

Grant program	Co-sponsor match	ASTA grant
Basic research grants	N/A	$545,940.00
Applied research grants	$69,507.00	69,507.00
TOTAL funds awarded	**$69,507.00**	**$615,447.00**

Applied Research Grants
Fiscal Year 1991

Project	Investigator/University	Industry Co-sponsor	Co-sponsor match	ASTA grant
ASM Algorithms/ VLDB Applications	Hal Berghel, Ph.D.,UAF David Roach, Ph.D., UAF John Talburt, Ph.D., UALR	Acxiom Corp. Conway	$40,000	$40,000
Value of feeding defatted rice bran to cattle	Arthur Goetsch, Ph.D., UAF/AG	Riceland Foods, Inc. Stuttgart	8,500	8,500
Manufacture of carboxylic acid chlorides	John Eubanks, Ph.D., Arkansas College	Arkansas Eastman Co. Batesville	21,007	21,007
TOTAL			**$69,507**	**$69,507**

June 30,1991

Basic Research Grants Awarded
Fiscal Year 1991

Project	Investigators/University	ASTA grant
Novel organometallic dithiooxalate complexes	Mark Draganjac, Ph.D. ASU	$32,000
Purchase of a superconducting FT-NMR with multinuclear capabilities	Tito Viswanathan, Ph.D. UALR	52,000
Development of a hydrogen/ carbon analysis system	M. Keith Hudson, Ph.D. UALR	27,821
Nutritive and protective roles of ascorbate in insects	Gary W. Felton, Ph.D. UAF/AG	25,800
Environmental data collection for the GRANDE project	Donald C. Wold, Ph.D. UALR	4,000
Development of a new type of photocatalyst	George Blyholder, Ph.D. UAF	55,980 *
Coherence in open quantum systems	Julio Gea-Banacloche, Ph.D. UAF	33,972
Generation and applications of squeezed light with frequency tunability	Min Xiao, Ph.D. UAF	75,516
Concentration measurements of a low pressure chlorinated hydrocarbon flame	Carl V. Wikstrom, Ph.D. UAF	37,439
Green June Beetle rearing, behavior, and semiochemical studies	Donn T. Johnson, Ph.D. Ron W. Buesher, Ph.D. UAF	30,987
In vivo studies of 19F MR fluoro analogues of porphyrin and chlorin photosensitizers related to photodynamics	S. Ramprasad, Ph.D. UAMS	27,000
Optimizing nuclear transfer for producing bovine embryos	Charles Rosenkrans, Jr., Ph.D. UAF/AG	28,690
Micromachining and microsensor development	R. Calvin Goforth, Ph.D. UAF	36,625
Brain metabolism in Alzheimer's disease using localized in vivo NMR spectroscopy	P. Mohanakrishnan, Ph.D. P.R. Jolles, Ph.D. UAMS	24,625
Computational simulation of fluid flow with applications to the human lung and beyond	Jeffrey R. Hammersley, Ph.D. Rama N. Reddy, Ph.D. UALR/UAMS	27,775
Neural network computing in the study of structural analysis of polymers and plastics	Jerry A. Darsey, Ph.D. UALR	25,710
Total funds awarded		**$545,940**

*Partially funded by energy-related grants

A glance back at FY 1991

September 1990

National Institute of Standards and Technology awards ASTA $125,000 grant for a Technology Extension Pilot Project to help small- and medium-sized Arkansas businesses access government technology.

October 1990

Governor Bill Clinton presents a $240,000 check from ASTA to the University of Arkansas at Pine Bluff to open a ***business incubator*** to serve small businesses in the Delta region.

November 1990

ASTA hosts seminar to train brokers in ***industrial networking***. About 40 economic development professionals from around the state attended.

TSI of Worcester, Massachusetts, buys the vacant Intox Lab in Redfield as the site for its new testing facility. ASTA invested $250,000 through its ***Seed Capital Investment Program*** to help finance the acquisition.

January 1991

Law Office Information Systems, Inc. is awarded $200,000 through ASTA's ***Seed Capital Investment Program*** to develop case law software, known as CaseBase.

ASTA staff brief the Arkansas Business Incubator Managers Association on the ***Technology Extension Pilot Project*** and the ***Arkansas Industrial Network Project*** at ABIMA's statewide meeting in Little Rock.

February 1991

NASA awards $150,000 to Arkansas to create the ***Arkansas Space Grant Research Consortium.*** ASTA contributed a $75,000 match to this EPSCoR-like program. The goal is to establish and develop programs for enhancing Arkansas' research and education infrastructure in aerospace science and technology.

ASTA releases its first ***"Report on Research Funded by the Arkansas Science & Technology Authority, FY 1986-FY 1990."*** The report focused on ASTA grants, private industry participation in research funding, and federal research grants in Arkansas.

Governor Bill Clinton signs Act 259 of 1991, authorizing the state to create its first ***residential math and science high school*** for high school juniors and seniors.

March 1991

ASTA creates the ***Challenge Grant program,*** granting qualified industrial networks one dollar for every dollar provided by their industrial members to start a network.

University of Arkansas joins national ***Material Handling Research Center.*** ASTA included $400,000 in its biennial budget request to help support the center.

May 1991

ASTA hosts an exhibit on biotechnology research in Arkansas at the ***Association of Biotechnology Companies'*** annual meeting in Washington, D.C.

Subcommittee to blue ribbon panel studying the Food and Drug Administration praises the ***National Center for Toxicological Research*** in Jefferson in its report to the panel. The subcommittee says there may not be another research institution in the country to match "the breadth and quality of NCTR."

Faced with uncertain state support, the ASTA Board of Directors recommends ***business incubators leverage outside funding*** to sustain their operations.

June 1991

By the end of the fiscal year, ***ASTA had awarded $627,952 in Basic and Applied Research grants*** to Arkansas scientists, the largest amount ever awarded in one year under these programs. ■

Comparative financial statements

State revenue and expenditures for 1990-91 biennium

Revenue	**FY 1990**	**FY 1991**
Revenue appropriation	$1,035,988.00	$1,050.578.00
Deferments	1,757.00	0.00
Net revenue allocation	**$1,034,231.00**	**$1,050,578.00**
Expenditures:		
Salaries	$297,759.87	$325,623.67
Employee benefits	69,734.60	68,754.15
Postage & delivery	5,620.02	4,376.25
Telephone & telex	2,935.04	1,698.01
Printing and duplicating	7,264.51	6,899.19
Office equipment maintenance	1,024.27	2,135.74
Office & equipment rent	44,973.67	44,895.21
Travel & sponsored meetings	20,603.80	15,717.41
Association dues & memberships	16,164.00	12,079.00
Professional fees	8,546.38	4,669.76
Centrex telephone services	8,824.35	10,099.23
Conference & convention fees	15,243.06	16,484.66
Insurance premiums	339.00	363.00
Stationery & office supplies	7,506.40	5,962.98
Subscriptions & publications	3,188.39	4,247.74
Software purchases	741.42	2,015.84
Equipment	9,859.65	10,888.88
Total operating expenditures	**$511,328.43**	**$536,919.72**
Research grants/incubators	211,038.65	361,445.12
Project match	279,414.03	139,046.88
Total expenditures	**$1,011,781.11**	**$1,037,411.72**
Net revenue allocation	$1,034,231.00	$1,050,578.00
Less total expenditures	1,011,781.11	(1,037,411.72)
Unspent allocation	**$22,449.89**	**$13,166.28**

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